

The advantages of multi-speed hydronic circulation



Multiple-speed circulation allows variability of pumps, later system retrofits and provides better system performance.

BY JOHN VASTYAN,
contributing writer

Hydronic systems aren't built. They're born. And like children in their formative years, we want them to perform well, to be sensitive to their environment and respond quickly to need.

First, there's the gestation period when the system exists only as a plan. In the mind of a talented and

experienced contractor, its many parts and functions are clearly visualized. A design takes shape and is fine-tuned as preparations are made to develop it.

Birth occurs when assembly begins, and the many parts of the system are brought together. Tubing runs are made, copper and black pipe is carefully aligned as components are brought together in the mechanical room. The near-boiler connections

look like a work of art. Just add water, right? Well . . . not so fast.

Zen master, chief Wet Head and hydronic sensei Dan Holohan urges us to "Be the Water." He encourages installers to visualize the course it will take, to step into the pipe, go with the flow and to see it pass through myriad pumps, valves and manifolds like blood through the circulatory system.

One of the newest developments to (Turn to Put a change-up... page 30.)

Radiant floors set development apart

(Continued from page 26.)

a nice way to differentiate our development, and these homes, from those offered by others."

All of the homes are heated hydronically. Each slab-on-grade home has Watts Radiant RadiantPEX tubing in the concrete slab foundation. The tubing is connected to reinforcement wire just above a layer of Insultarp. The second story areas are all heated by staple-up application of highly flexible Onix tubing, an EPDM/synthetic rubber tubing also manufactured by Watts Radiant.

"We're pretty fixed on Onix because it's so easy to install," said Tony Fischer, project manager for Columbus-based Freeland Contracting Company, the firm that is installing all of the heating systems at Bishopsgate. "It has the feel and flexibility of installing a three-quarter inch piece of hemp rope — it's got substance and

great flexibility at almost any temperature. Attempting to do PEX staple-up in the spring, fall and winter is like a wrestling match. Onix goes where you want it with no fight at all. It comes off the spool perfectly."

"Another key advantage is that when Onix is stapled-up, it flattens slightly," continued Fischer. "That's exactly what it's designed to do. The flattening of the tubing against the subfloor above increases the surface contact with the wood, dramatically improving thermal transfer from the pipe to the floor above. That's why heat transfer plates aren't needed with Onix. That saves a lot of time and expense. Of course, we use foil-faced insulation from below to complete installation of the staple-up sections."

"Radiant heat is a great investment for homeowners," added Fisher. "Not only do you get incomparable comfort, and the highest heating system

energy efficiency available, but with no air grates, radiators or baseboard to factor-in, there's also no interference with room function or furniture layout. That's something that the O'Keefe's and their prospective homebuyers took great interest in as well."

The radiant heat system adds about \$7,500 to the cost of each home, an investment that will — because of the higher operational efficiency — reward homeowners with full "pay-back" in six to seven years.

"Without question, warm floors are the most comfortable form of heat you can have," says Hanse Cromer, a manufacturer's representative for Steffens-Shulz, a Columbus firm that specializes in plumbing and mechanical components. "For years, we've been beating that drum in Columbus, and finally we're seeing broad acceptance of radiant heat."

"We feel very good about our deci-



The 39 condos have 2,486 to 2,982 sq. ft. of floor space, with all rooms heated to comfortable levels using radiant floors and zone controls.

sion to go with radiant at Bishopsgate" added Terry O'Keefe. "We were introduced to it years ago when we installed it for an addition to our home. For me, it was like one of those 'love at first sight' experiences. We enjoy it for its comfort, and for the energy efficiency."

"It's an amenity that complements the feel and luxury of the 39 detached condominiums at Bishopsgate," said Katie O'Keefe. All of the homes are available as a ranch, one-and-a-half story or two-story models. Each has connected to it; a rear-entry, oversized, two-car garage. The price range is \$330,000 to \$350,000, and the interior space varies between 2,486 to 2,982 square feet.

Inspired by homebuyer interest in radiant heat, Terry O'Keefe recently broke ground on two new, Columbus-area condo developments that will also be exclusively radiantly-heated.

O'Keefe describes his interest in radiant heat as something of a conversion. "It's time that more people learn about it, and to discover the incredible comfort it offers," he concluded. "As a developer, I'm delighted to have 'found' it. Once I did, and set a path to offer it to homeowners, I knew it would be something that they would eagerly pay a little extra for." ■

Put a change-up circulator in your radiant rotation

(Continued from page 28.)

enter this “bionic,” piped environment is the concept of multi-speed circulation. Not variable speed, but multi-speed. Now offered by a few manufacturers, new wet rotor circs — available at the same price point as single speed pumps — have quickly gained the attention of hydronics pros nationwide, including the Dan Foley, Dave Yates and the Bob “Hot Rod” Rohr.

There are many advantages to multi-speed circulation, including: variability or adjustability of the pumps, suitability for later system retrofits or changes, better overall system performance, making call-backs less likely and fewer pumps in shop and truck inventory.

One of the most important facets to optimal circulation for hydronic systems is for contractors to match a pump’s performance, or flow characteristics, to the specific job that it needs to perform within the system. A single-speed pump has one performance curve — a measurement of head (ft) and flow (gpm) — and operates at that level only, with great predictability. But these new circulators offer a much broader range of performance. With the flick of a switch, various speeds can be chosen, easily changing head and flow to meet the specific needs of the system.

The performance of a leading multi-speed circulator, for instance, has a flow range of zero to 17 gallons per minute and a head range of zero to 19 feet. The three-speed circulator has a



Use one pump and select the speed to match the flow and head you want. In large radiant heat installations multi-speed circs provide the ability to balance water flow to each manifold no matter how many loops are on it.

2-pole, single-phase motor, integrated (removable) check valve and can handle closed-system fluid temperatures of up to 230°F and all the way down to 36°F.

New mantra: “Be the lizard”

“I like to think of it as lizard-like adaptability,” says Dave Yates, president of F. W. Behler Inc., a York, Pa.-based plumbing and mechanical contracting firm. “Just as a chameleon can change its colors and virtually disappear into the background, a multi-speed circulator dissolves into the system with quiet, almost invisible operation that’s set to meet the exact demands of the system.”

“I was recently introduced to the SuperBrute pumps through a job that specified the circulator,” said Vince Youndt, president of Vertex Mechanical Inc., based in Stevens, Pa. “We were very impressed with the concept of having three speeds to choose from. With radiant heating, we already have the ability to create as much or little heat in any particular zone by cutting back on the valves, and to introduce a circulator with three speeds only gives us more control and versatility.”

“Our core business is radiant and hydronic systems,” offered Dan Foley, president of Foley Mechanical Inc., based in Alexandria, Va., and past-

president of the Radiant Panel Association. “Most of our installations are split into multiple zones. Some are large zones requiring high flow rates and some are small zones requiring low flow rates. We also use injection mixing controls which require relatively low flow rates.

“I always do the math and calculate heat loss, flow rate and pressure drop for each zone,” added Foley. “I use this information and the manufacturer’s pump curve to select the proper pump for each zone. In the past, we might have three or four different pump models on one job, all selected to match the exact needs that we’ve determined. With multi-speed pumps, I can use one pump and select the speed to match the flow and head that we want.

“This also helps us to avoid oversizing the pumps using a ‘one-size-fits-all’ approach that’s not only expensive on the front end, but isn’t efficient electrically, either,” he said.

“That’s an important advantage for us, as well,” added Youndt. “We’re



Multi-speed circulators allow contractors to stock far fewer pumps in shop inventory and on trucks.

doing a large radiant heat installation right now where the multi-speed circs have given us the ability to balance water flow to each manifold no matter how many loops are on it. On this job, we have some manifolds with up to seven loops, and one manifold with only one loop. With multi-speeds, we can deliver as much water as we need to each manifold.”

Suitability for later system retrofits or changes

“Let’s face it: many pumps aren’t operating within the ‘sweet spot’ on their flow chart,” added Yates. “By checking the delta-P across the pump’s inlet and outlet, or by monitoring the loop’s delta-T for desired results, a field technician can adjust a multi-speed pump to operate within the most desirable pump curve. That saves energy and promotes longer pump life.”

And, say the experts, the use of multi-speed pumps permit downstream adjustments, changes and retrofits in stride. “We had two situations in one week where multi-speed pumps made our day,” said Yates. “One customer wasn’t getting suffi-

(Turn to Circulators, page 32.)

Clean heat, comfortable warmth make breathing easier

As they designed and built their dream home, Del and Sandi Goetze of Lakeville, Minnesota never doubted that they would install a Wirsbo radiant floor heating system. They had experienced the unique comfort of the system in the basement levels of two previous homes. But, most importantly, they have a young son with severe allergies. The comfort and the cleanliness of radiant



Wirsbo Radiant Floor Heating provides cozy comfort under any floor covering — wood, tile and carpet. Heat radiates from the floor and warms people and objects in the living room. It isn't wasted at the ceiling height, which in this case is a soaring 24-foot vault.

floor heat compelled them to use the system in every level of their new home.

"Forced-air heating systems churn air, spewing dirt, dust and pollen throughout the interior spaces. Building a new home was my opportunity to create the best possible environment for our son. The radiant floor heating system we installed has improved our son's health. And my wife and I breathe easier, too," said

Goetze.

Using radiant floor heat had additional benefits for the Goetze family. Their two-story, 5,900-square-foot home features high, vaulted ceilings, huge windows and a walkout basement. Hard surface flooring materials were installed in living and dining areas, the solarium/spa and the kitchen and baths. The wood, ceramic tile and concrete aggregate floors are comfortably warm and dry. With

the Wirsbo system, the flooring selections are not only beautiful, they are also practical.

"We would have been crazy to use a forced-air heating system with all that wood and tile. Our floors would have been frigid," said Del and Sandi Goetze.

The Goetze family is also pleased with the efficiency of the system. Their monthly natural gas bill averaged (Turn to Radiant helps... page 34.)

Circulators

(Continued from page 30.)

cient heat in a master bath floor for months. Then the circ went out on it. Rather than doing an exact replacement of the single-speed pump, we replaced it with a multi-speed circ and monitored its performance. The pump's middle setting did the job sufficiently, but the high setting performed perfectly. Now a high-end job

has no compromise."

The other installation that Yates referred to was at a home where the owners planned, later, to activate 16 feet of fin-tube baseboard radiation in an unfinished part of the house. As they did the install, they calculated that the existing circ zone worked optimally at the pump's lowest setting. And, for whenever the room would be finished, all that Yates' crew would need to do would be to fill the line and switch the

pump to a higher setting.

126 miles from nowhere . . . and you have the wrong pump?!

Another key advantage for installers is the ability to standardize on one pump line. Multi-speed pumps are adept at serving so many needs that firms like Yates' and Foley's are standardizing on one pump line.

"We do a lot of remote jobs," continued Yates. "Last year one of my crews was working on a large radiant system in one of the state's most undeveloped regions, 126 miles from the shop. Thinking that they had all the right circs, they discovered that wasn't the case at all when it was time to install them. This was a major deal at the time. Multi-speed pumps would've solved the problem instantly."

"We now have far fewer pumps in the shop inventory and on the trucks," added Yates. "It's allowed us to reduce our inventory, and the supply house is doing the same thing. It's a definite win-win."

In developing its SuperBrute multi-speed circulator, Grundfos engineered-in two other characteristics that add to its value for contractors. It has super-high starting torque, made possible by a starting torque booster that pulsates DC current into the winding, making the pump act like an impact driver, virtually eliminating no-start situation. It also has an integrated, removable, check valve that doesn't reduce pump performance and eliminates the expense of an inline check valve.

"Until recently, we had only one circulator line in the inventory," concluded Youndt. "But the multi-speed circs have definitely changed that. We carry a new line now. The applications for the new pumps are happening at such a quick pace that we know we made the right decision. I agree with Dave Yates — it's truly a win-win." ■

Manheim, Pa.-based John Vastyan is a journalist and communications professional whose work focuses on the plumbing and mechanical, radiant heat and geothermal industries. He can be reached at 717/664-0535 or by email at cground@ptd.net.